CLAIMS

1. An apparatus for measuring the deformation of a system, the apparatus comprising:

- an elongated elastic probe,
- a conducting medium attached to or contained by the probe, and
- two or more electrodes being electrically connected by the conducting medium, the electrodes being attached to the probe,

wherein the apparatus furthermore comprising means for measuring an electrical parameter between at least two of the number of electrodes, the measured electrical parameter being indicative of a deformation of the probe in at least the longitudinal direction of the elongated probe.

2. An apparatus according to claim 1 comprising four or more electrodes, wherein at least two of the four or more electrodes are measuring electrodes comprising means for measuring the electrical potential between them, and wherein other at least two of the four or more electrodes are generating electrodes comprising means for generating an AC-field between the measuring electrodes.

3. An apparatus according to any of the claims 1 or 2, wherein the measured electrical parameter is indicative of a force of a certain magnitude being applied to the probe.

4. An apparatus according to any of the claims 3 or 4, wherein the force or the deformation are deduced from the measured electrical parameter by means of a pre-determined calibration function.

5. An apparatus according to any of the preceding claims, wherein the apparatus further comprising timer means for determining a timing of a change of the measured electrical parameter.

6. An apparatus according to any of the preceding claims, wherein the more than two electrodes are placed along a reference curve of the probe.

7. An apparatus according to claim 6, where the reference curve is a longitudinal axis extending along the elongation of the elongate probe, and thereby the more than two electrodes are placed along the longitudinal axis.

8. An apparatus according to any of the preceding claims, wherein the conducting medium is a liquid medium serving as an electrolyte for conducting the electric current between the electrodes.

9. An apparatus according to claim 8, wherein the liquid medium is a liquid preferably non-harmful to the bodily hollow system or the engineered structure being stimulated, such as an acid like HCl in the stomach, or such as bile salts in the small intestine, or such as water with NaCl in the esophagus.

10. An apparatus according to any of the claims 1-7, wherein the conducting medium is a solid medium, such as compounds including at least one substance selected from the group of: soft metals, polymers, ceramics, composites and natural materials.

11. An apparatus according to any of the preceding claims, further comprising at least one inflatable balloon situated between a proximal end and a distal end of the probe, and the apparatus comprising means for passing an inflating fluid, preferably a liquid, from the proximal end to the balloon, and where the apparatus optionally is provided with means for measuring at least one physical properties of the balloon.

12. An apparatus according to any of the preceding claims, further comprising means for passing a chemical substance through one or more channels inside the probe to a number of openings in side-walls of the probe and out into the hollow system.

13. An apparatus according to any of the preceding claims, further comprising means for passing an electrical current through a number of wires in a number of the canals inside the probe, and when passing the electrical current to an outer surface of the probe, the outer surface being a surface abutting the inner wall of the hollow system.

14. A method for measuring a deformation of a system by introducing into the system an elongated elastic probe, the probe comprising:

- a conducting medium attached to or contained by the probe, and
- two or more electrodes being electrically connected by the conducting medium, the electrodes being attached to the probe,

wherein a deformation being indicative of a deformation of the probe in at least the longitudinal direction of the elongated probe is measured by measuring an electrical parameter between at least two of the two or more electrodes.

15. A method according to claim 14, comprising four or more electrodes, wherein at least two of the four or more electrodes are generating electrodes generating an AC-field between at least two other electrodes being measuring electrodes, the measuring electrodes measuring the electrical potential between them.

16. A method according to any of the claims 14 or 15, wherein the deformation of the probe is indicative of a force of a certain magnitude being applied to the probe.

17. A method according to claim 16, wherein the force or the change in distance are deduced from the measured electrical parameter by means of a pre-determined calibration function.

18. A method according to any of the claims 14-17, wherein a timing of a change of the measured electrical parameter is being determined, so as to obtain a measurement of a velocity and/or an acceleration of the deformation of the probe.

19. A method according to any of the claims 14-18, wherein the more than two electrodes are placed along a reference curve of the probe, and wherein the physical quantities, such as the forces, the distances, the acceleration or the speed deduced from at least the measured electrical parameter between at least two electrodes, are quantities measured along a direction defined by the reference curve.

20. A method according to claim 19, wherein the reference curve is a longitudinal axis extending along the elongate probe, thereby the physical quantities measured between the at least two electrodes are quantities along a substantial longitudinal extension of the probe.

21. A method according to any of the claims 14-20, wherein the probe is being provided with at least one inflatable balloon situated between a proximal end and a distal end of the probe, and where the method comprises the further step of inflating the at least one balloon, until the balloon abuts an inner wall of the system in order for the balloon and the probe to be fixed longitudinally in relation to the system.

22. A method according to claim 21, wherein the measuring of the electrical parameter between at least two of the two or more electrodes is obtain in correlation with a pressure change inside the balloon, a volume change of the balloon, a determination of the cross-sectional area of the balloon or other changes of the balloon.

23. A method according to claim 21, wherein the measuring of the electrical parameter between at least two of the two or more electrodes is obtain in correlation with a wall change of the system surroundings of the probe

24. A method according to any of the claims 14-23, wherein a measurement during thermal stimulus is performed, when the probe is filled with a fluid, preferably a liquid, the liquid introducing a change in temperature of the probe and/or balloon and thus of an outer surface of the probe and/or balloon, the outer surface being a surface abutting the inner wall of the system, and where the deformation of the system is measured in correlation with the temperature of the fluid inside the probe and/or balloon.

25. A method according to any of the claims 14-24, wherein a measurement during chemical stimulus is performed, when passing of a chemical substance through a number of the canals inside the probe to a number of openings in side-walls of the probe and out into the hollow system, and where the extension or the contraction of the hollow system is measured in correlation with the composition of the chemical substance.

26. A method according to claim 25, wherein the method is performed for measuring the passage of the chemical substance past a part of the probe abutting the internal wall of the system, the passage being indicative of the ability of the system to exercise a restraining influence, alternatively to exercise a passing influence, on liquids and solids.

27. A method according to any of claims 14-26, wherein a measurement during an electrical stimulus is performed, when passing an electrical current through a number of wires in a number of the canals inside the probe, and when passing the electrical current to an outer surface of the probe, the outer surface being a surface abutting the inner wall of the hollow system, and where the extension or the contraction of the hollow system is measured in correlation with the magnitude of the electrical current applied.

28. A method according to any of the claims 14-27, wherein the method is performed anywhere in one of the following bodily systems: the muscles, the connective tissue, the skin, the bones, or where the method is performed anywhere in one of the following bodily hollow systems: the digestive system including the stomach, the urogenital tract including the bladder, the cardiovascular system including the heart, the lymph system, the ear canal including the eustachian canal and the posterior nares.

29. Apparatus according to any of claims 1-13, for use of subjecting a number of artificially applied stimuli to a bodily hollow system of a person or an animal, the stimuli being any of

the stimuli: mechanical stimulus, thermal stimulus, chemical stimulus and electric stimulus.

30. Apparatus according to any of claims 1-13 for performing measurements in part of the digestive system including the stomach, preferably performing measurements in the gastrointestinal tract based on a prior stimulation of any of the following kinds: mechanical stimulus, thermal stimulus, chemical stimulus and electric stimulus.

31. Apparatus according to any of claims 1-13 for performing measurements in part of the urogenital system of a person or an animal, the urogenital system including the urinary bladder based on a prior stimulation of any of the following kinds: mechanical stimulus, thermal stimulus, chemical stimulus and electric stimulus.

32. Apparatus according to any of claims 1-13 for performing measurements in part of the cardiovascular system of a person or an animal, the cardiovascular system including the heart and the lymph system, based on a prior stimulation of any of the following kinds: mechanical stimulus, thermal stimulus, chemical stimulus and electric stimulus.

33. Apparatus according to any of claims 1-13 for performing measurements in part of the tissue of a person or an animal, the tissue including epitheliuous tissue, connective tissue, skin, and adipose tissue, based on a prior stimulation of any of the following kinds: mechanical stimulus, thermal stimulus, chemical stimulus and electric stimulus.

34. Apparatus according to any of claims 1-13 for performing measurements in part of the motoric system of a person or an animal, the motoric system including the muscles and the bones, based on a prior stimulation of any of the following kinds: mechanical stimulus, thermal stimulus, chemical stimulus and electric stimulus.

35. Apparatus according to any of claims 1-13 for performing measurement in non-human and non-animal systems such as in plants and in engineered structures.